**History: Sustainable Agriculture**

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| **Course:** Grade 11 Academic Biology | **Course Code:** SBI3U |
| **Unit Title:** Plants | **Topic:** Sustainable Agriculture |
| **Lesson Title:** Yesterday, today, and tomorrow’s sustainable agriculture | |
| **Category:** Knowledge and Thinking and Investigation | |

**Curriculum Expectations addressed:**

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| **Big Idea.** Plant variety is critical to the survival and sustainability of ecosystems  **A1.1** formulate relevant scientific questions about observed relationships, ideas, problems, or issues, make informed predictions, and/or formulate educated hypotheses to focus inquiries or research  **A1.3** identify and locate a variety of print and electronic sources that enable them to address research topics fully and appropriately  **A1.7** select, organize, and record relevant information on research topics from a variety of appropriate sources, including electronic, print, and/or human sources, using suitable formats and an accepted form of academic documentation  **A1.9** analyse the information gathered from research sources for logic, accuracy, reliability,  adequacy, and bias  **A1.11** communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g., data tables, laboratory reports, presentations, debates, simulations, models  **F1**. evaluate the importance of sustainable use of plants to Canadian society and other culture  **F1.1** evaluate, on the basis of research, the importance of plants to the growth and development of Canadian society (e.g., as a source of food, pharmaceuticals, Aboriginal medicines, building materials, flood and erosion control; as a resource for recreation and ecotourism  **F1.2** evaluate, on the basis of research, ways in which different societies or cultures have used  plants to sustain human populations while supporting environmental sustainabilityf2.2 design and conduct an inquiry to determine the factors that affect plant growth  **F2.4** investigate various techniques of plant propagation  **F3.4** describe the various factors that affect plant growth |

**Assessment Tasks/Activities, Strategies and Recording Devices:**

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| **Tasks/Activities** | **Assessment Strategies** | **Assessment Types** | **Recording Devices** |
| * Gallery Walk * Make a “time map” * Research | * Student presentation * Teacher check in * Collect “Time Map” * Online record of posting | As/ For Learning | * Time map * Online posting |

**Instructional Focus:**

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| **Teaching/Learning Strategies:**   * Gallery walk * Time map * Online research | **Student Groupings:**  3-4 people per group; teacher-made, mixed ability |
| **Differentiation Strategies:**   * For the “wallwisher” research posting, students can choose to post up a video, picture, or document related to any concept that falls under sustainable agriculture(differentiated for interest) * Time map incorporates illustrations and text (differentiated for learning style) * When constructing the Time Map, students have the option of using the textbook, having discussion with peers, or using the internet as a resource (differentiated for ability) | |
| **Adaptations/Accommodations for Exceptional Students:**   * Exceptional students will be provided with assistive technology when researching(larger keyboards and larger screen) * Instructions for each activity will be written on the board in large clear handwriting * Exceptional students may be given extra time when researching | |

**Notes and Reminders**

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| * Teacher will have to provide each group with 2-3 different magazines for gallery walk * Should remind students the day before to bring in their laptops and textbooks * Photocopy the “case study” handout beforehand |

**Sources**

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| Galbraith, Donald I. *McGraw-Hill Ryerson Biology 11*. Toronto: McGraw-Hill Ryerson, 2001. Print.  Dookhan, Isaac. *A History of the Virgin Islands of the United States*. Kingston, Jamaica: Canoe, 1994. Print. |

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| **List Materials**   * Lab Equipment   √ Technology needs   * Audio visual | **Include in Appendix**  √Instructions for students   * Scaffolding support   √Handouts |

**Curriculum Connections**

* **Big Ideas:** Plant variety is critical to the survival

and sustainability of ecosystems

* **Ministry Expectations** A1.1, A1.3, A1.7, A1.9, A1.11, F1, F1.1, F1.2, F2.4, F3.4
* **Prior Knowledge:** plant reproduction and past agricultural practices

**Unit and Title of Lesson:** Yesterday, today, and tomorrow’s Sustainable Agricultural Practices (history of the topic)

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**Assessment Strategies:** Polleverywhere can be used to track students understanding of the concepts. It can also track whether or not students agree with views presented by their peers. <http://www.polleverywhere.com/>

**Time: 15 minutes**

**Rationale for choice of T/L Strategy:**

* Introduces the topic of plants and society
* Challenges students to use their evaluative and analytical skills to find images that suit question
* Gives students an opportunity to communicate their opinions with their peers

**Magazine Gallery Walk:**

Students will be trying to answer the question: Why are plants important to society using cut-out pictures from a magazine

1. Students will be placed into groups of 4
2. Each group receives 1-2 different magazines
3. Groups must cut out one image that they feel answer the question
4. They glue pictures to a piece of blank paper
5. Gallery walk and group sharing

**Before: Minds On**

**During: Action**

**Time: 45 minutes**

**Rationale for choice of T/L Strategies:**

* Students will be challenged to analyze the case study and come up with explanations for their decisions
* The Time map allows them to communicate their ideas using illustrations and writing
* The time map also allows students to extrapolate what they have learned about sustainable agricultural practices and apply it to the present and future society

**Case Study and Time Map**

1. Students will remain in their groups of four
2. Each group will receive the “cotton” case study. Refer to Appendix A1
3. Students will be given 15 minutes to analyze the case study
4. They will then create a Time map (refer to appendix A2) on chart paper. Students can flip to section16.3 (pages 598-611) in their textbooks as a resource when completing the “past” and “present” section of their mind map. The internet can be used for the completion of the “future” section
5. Each group will then be given 2 minutes to present their time map to the class

**After: Consolidation & Connection**

**Time: 15 minutes**

**Rationale for choice of T/L Strategy:**

* Highlights big ideas
* Allows students to practice their research skills
* Allows students to find alternative sustainable agricultural practices
* Gives students an opportunity to share their findings with their peers

**Wall Wisher**

1. Students will use their laptops to go onto the following site: <http://www.wallwisher.com/wall/oiseplant>
2. They will then research an answer to the following question
   1. Share at least one sustainable agricultural practice in today’s society
3. They will then post (tweet) their thoughts and links to resources on the group’s “wall”

(An example of a completed “wall” is shown in appendix A3)

**Rationale for Choice of T/L Strategy:**

* This allows students to further improve their research skills and also be able to actively respond to their learning through a poster

**Time: 5 min**

**Next Steps**

**Glogster posters** <http://www.glogster.com/>

* Students will go home and look through their peer’s

Comments and references

* They will then choose 2 comments they found interesting

And create a online poster to bring in to class for group

Discussion the following day

**Teacher Notes**

Lesson Plan: History of Sustainable Agriculture

Grade and Unit: Grade 11 - Plants: Anatomy, Growth, and Function

Content:

Minds On: (**15 minutes)**

1. Organize students into groups of 3-4. Hand out 1-2 magazines, 1 pair of scissors, 1 blank piece of paper, and 1 stick of glue to each group
2. Present the question, “Why are plants important to society?” by writing it on the board.
3. Give students 8 minutes to discuss in their groups what they think the answer to the question is. They are then going to flip through the magazines and cut out one image that best represents their answer. The image is then placed onto a blank piece of paper.
4. Once students are done, they will do a gallery walk around the room to see all the other group’s images. During this time they will be placing a check mark beside the image if they agree with their opinion, a question mark if they are not too sure of the image, or an exclamation mark if they really feel that the image was very insightful
5. After the gallery walk, have a 5 minute class discussion where students shared their answer to the question

Action (45 minutes):

1. Have students remain in their groups.
2. Each group will receive the “cotton” case study handout. See Appendix A1
3. Students will be given 15 minutes to analyze the case study
4. Each group will be given 1 piece of chart paper. They will then create a Time map (refer to appendix A2) on chart paper
   1. Students can refer to section 16.3 ( pages 598-611) in their textbooks when completing the “past and present” sections of the time map
   2. For the “future” section of the time map, students are encouraged to try and think critically and creatively to come up with their own unique idea. If they are having difficulty, then they are allowed to use the internet as a catalyst for their brainstorming.
5. Each group will then be given 2 minutes to present their time map to the class

Consolidation: (**15 minutes**)

1. The day before class, log onto [www.wallwisher.com](http://www.wallwisher.com) and create a wall with the instruction, “Share at least one sustainable agricultural practice in today’s society”
2. Remind students the day before to bring in their laptops. If students don’t all have laptops then you can alternatively make this part of their homework assignment
3. In class students will go onto the “wallwisher” wall you made and will research and post up their findings.
   1. An example of a completed wallwisher is [www.wallwisher.com/wall/oiseplant](http://www.wallwisher.com/wall/oiseplant)
4. This “wall” will be a way for students to share their research with their peers. This is also a way of keeping them accountable for researching.

Next steps**: (5 minutes)**

1. Tell students that they will have to go home and visit the classes “wallwisher” wall.
2. They will spend some time looking through their peer’s wall wisher posts
3. They will then choose two of those posts that they thought were the most interesting
4. They will then create a small informative poster on Glogster.com that has pictures and texts that explains each of the two sustainable agricultural practices they chose.
5. These posters will be used for an opening discussion in the next class.

**Appendix A1** *(student handout)*

**Case Study:**



During 1770 to 1860, slave trade flourished in America. Growing cotton was a very lucrative business, and many slaves were needed to help grow and harvest the cotton crop. Cotton was the only crop that was grown on many of the plantations, because cotton was the most profitable cash crop.

When these plantations first started becoming established, large amounts of cotton crop were successfully harvested. However, as each successive year passed by, many of the plantation owners were puzzled at how there a decreasing amount of cotton was being produced from their fields. In fact, some slave owners had to start selling some of their slaves in order to cope with the gradual loss in cotton production each year. After several successive years, some of the plantations had to close down since no cotton was able to be produced from the land.

In your groups, brainstorm some of the possible agricultural causes for this loss in crop yield. Once your group has arrived at a conclusion and a well developed explanation, illustrate and explain your answer using a Time Map.

**Appendix A2:** *(student instruction)*

**Time map instructions:**

Hand each group of students a large piece of chart paper and a couple of different coloured markers. Have each group draw a Time map template as illustrated below.

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| **Past** | **Present** | **Future** |

1. Once each group has drawn their mind map
2. They will illustrate the agricultural practice mentioned in the case study in the “past” portion of the mind map.
3. They will then, in point form, evaluate whether or not this practice is sustainable and give some supporting reasons for their decision
4. They will then identify a agricultural practice that is done in today’s society and also evaluate and explain their reasoning
5. Finally, they will brainstorm what they think the future holds in terms of agricultural practices. They will also illustrate and give an explanation for their choice.

Example of what a completed Wallwisher **Appendix A3**

